'Test Readings . . . Excellent'

Full-Scale Aircraft Crash Test: A Smashing Success

It wasn't a typical day at the sled track in Area III — no ordinary, run-of-the-mill rocket sled test, this. And "flying low" took on a different meaning that day.

Afterward, there wasn't much left of the F-4 Phantom jet aircraft that moments before had been streaking down Sandia's 2000-ft.-long, two-rail rocket sled track. The plane was demolished — reduced to rubble — as it impacted a massive, one-million-pound block of reinforced concrete at the end of the track.

There was meaning — and motive — in all this motion. The first-of-its-kind test was designed specifically to help researchers predict the impact forces of an aircraft crashing directly into a nuclear power-plant structure, according to Walt von Riesemann, supervisor of Containment Technology Div. 6523.

"Flying low" took on a different meaning that day.

"The data are going to give us an unprecedented ability to predict the impact force when an aircraft crashes into a building," says Walt. "Sure, we'd previously done some fairly accurate computer analysis, but the computer models were untried on the real thing. Not anymore.

"The test was exciting, to be sure. However, the important result is that we've advanced the state of the art in designing large structures for nuclear power plants, and can probably accurately predict the effects of an aircraft crashing into *any* important structure." Walt and his staff have been working on the integrity of nuclear power-plant structures for several years, but he notes that only recently have airplane crashes become a concern.

Six previous crash tests at Sandia had sent full-scale GE J79 turbojet engines into a reinforced concrete wall. But to make further improvements on the computer models, Walt explains, a full-scale impact test of a complete aircraft was needed.

The full-scale test was a collaborative effort between Sandia and Japanese researchers. It was funded by the Muto Institute of Structural Mechanics, Inc. (Tokyo) and performed at Sandia under terms of a joint US-Japanese agreement for cooperation on nuclear safety engineering and research.

(Continued on Page Four)

THIS FULL-SCALE IMPACT TEST at Sandia demolished an F-4 Phantom instantly. The test was funded by the Muto Institute of Structural Mechanics, Inc. (Tokyo) and performed here on the Labs' 2000-ft.-long rocket sled track under terms of a joint US-Japanese agreement for cooperation on nuclear safety engineering and research. See additional photos of the test sequence on page four. (Photo courtesy of Photometrics and Optical Development Div. 7556)

LAB NEWS

VOL. 41, NO. 16 SANDIA NATIONAL LABORATORIES AUGUST 11, 1989

Collaborations Strengthening UNM — and Sandia

Sandia and UNM: A Partnership That Works

Combine the efforts of a national lab with those of a university with top-notch technical researchers and what you get is *synergy* — the combined action is greater than the sum of the actions of each working separately.

That's why strengthening the ties between Sandia and the University of New Mexico has long been the goal of the Joint Working Group (JWG) on Education (see "Joint Working Group Active Since 1983," page six).

Among the JWG's achievements are an expanded Sandia-University Research Program and a new Joint Appointments Program; both are Sandia funded programs that help attract and support new university faculty members. It also helped establish the Special Microelectronics Masters Program at UNM and expand the number of interactive television courses beamed from UNM to Sandia, increasing the options for the continued education of Sandia staff.

The group met recently to review existing relationships between UNM and Sandia and to explore ways of enhancing them.

MAUREEN BACA (3510, standing) led off the panel discussion, "Changing Demographics and Education," at a recent meeting of the UNM-Sandia Joint Working Group on Education. Other panel members are (from left) Dan Hartley, VP of Energy Programs 6000; James Thompson, Dean of Engineering, UNM; Margaret Montoya, Special Advisor to the President for Affirmative Action, UNM; Basil Steele, supervisor of Intrusion Detection Systems Technology Div. 5249; and Paul Risser, VP for Research, UNM.

"We want to continue building — in an organized way — the already considerable collaborative efforts between Sandia and UNM."

"We want to continue building — in an organized way — the already considerable collaborative efforts between Sandia and UNM," says Bob Eagan (1800), who co-chairs the JWG with UNM's Paul Risser, Vice-President for Research. "We're also looking at new areas for future interactions."

Other JWG members are Jim Schirber (1090) George Samara (1150), Maureen Baca (3510), and Danny Brown (3520). UNM is represented by Chris Garcia, Vice-President for Academic Affairs; Hobson

(Continued on Page Five)

This & That

Pass the Crow, Please -- Sometimes we take a few jabs at those who misuse the language. It's in good fun, but when you dish it out, you've gotta be willing to take it. In last issue's story about the solder leveler, we published this phrase: "The invention of the two Sandians -- both now retired -- did not create a new product, but it did allow that product to be made more easily. . . ." Ken Hueter (9115) asks if the Personnel Dept. is increasing the staff by inventing them. Ken, the recent wet weather really brought out the type lice -- nasty little creatures that just love to foul up our prepositions.

* * *

I'll Have a Second Helping -- While I'm "confessing," I need to clarify something that I tried to clarify several issues back. I wrote that unsigned "Feedback" items are trashed. Not true. If I'd read the fine print (getting harder every day) on the Feedback form, I would've learned that all legitimate comments/suggestions/questions are sent to appropriate directors for their information, even though you don't include your name. But, of course, you get no response -- no feedback.

Let me reemphasize, though -- if you include your name and request that it not be used in connection with your comment or question, only you and the Feedback coordinator know who submitted it, and "she ain't talking." Plus, you'll really get some feedback.

* * *

Net Gain: 224 Hours -- A clinic run by the nonprofit Albuquerque Family Health Center had "lost" more than a year's worth of computer data and was facing about 240 work hours to re-enter it. But Gary Cable's (9114) volunteer efforts made that unnecessary. Center Director Luis Rey Gonzales wrote in a letter of appreciation to Gary's supervisor, Ben Johnson: This "friend of our center for a number of years graciously donated approximately 16 unpaid, after-work and weekend hours over the course of 5 days and recovered all of our data flawlessly. You can be proud . . . of the quality of personnel your organization employs and the contribution they make to our community."

* * *

Speaking of Community Service -- Check out the photo of retiree Sam Gaeto in this issue. Sam recently completed 26 consecutive seasons of service as an official in Albuquerque's Thunderbird Little League. He helped establish the league in 1964 and has been involved ever since.

Incidentally, Sam is a strong proponent of the AT&T Savings Plan. He and his wife Dorothy have enjoyed some major trips since he retired from the Labs in '86, including ones to China, Alaska, the Caribbean, and a photo safari to Kenya and Tanzania. And they aren't through -- they're going to Australia and New Zealand next April. "Participating in the savings plan made all these great trips possible," he says.

* * *

And We Thank You for Your Support -- Regular readers of this column (yes, there are a few) know we're now using a desktop publishing system to produce the LAB NEWS. We've had problems, and we've still got some bugs (including those type lice), but we've had a lot of fine help, and we're still getting it, from some very helpful Sandians -- the Org. 3100 Computing Technology Support Project group -- Gary Shepherd (DMTS, 2614), Mike Heiser, and Denise Archuleta. They've done everything except dry our tears during our early frustrations. Thanks, folks. •LP

LAB NEWS

Published Fortnightly on Fridays

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Recent Patents to Sandians

Cliff Mendel (DMTS, 1272): Current-Level Triggered Plasma-Opening Switch.

Bill Bonivert (8312), John Hachman (8312), and Joseph Farmer (LLNL): Measuring Surfactant Concentration in Plating Solutions.

Hsi-Tien Chang (6252): Downhole Pulse Radar.

Bob Perry (former Sandian): System for NO Reduction Using Sublimation of Cyanuric Acid.

Bill Cowan (1220): Magnetic Reconnection Launcher.

Wen Hsu (8347): Getter Pump for Hydrogen and Hydrocarbon Gases.

Dave Swahlan (5175): Anti-Terrorist Vehicle Crash Impact Energy Absorbing Barrier.

David Ginley (1144), Tom Zipperian (1141), and Timothy Drummond (former Sandian): Substrate Solder Barriers for Semiconductor Epilayer Growth.

Charlie Arnold (DMTS,1811), Jim Aubert (1813), Roger Clough (1811), Pete Rand (DMTS, 1813), and Al Sylwester (1811): Low Density Microcellular Carbon Foams and Method of Preparation.

Countdown to 40

Sandia Life During First Five Years

Sandia Corporation will be 40 years old on Nov. 1, 1989. Until then, the LAB NEWS will publish related short articles and historical tidbits in most (if not all) issues.

Many early Sandians lived, as well as worked, on Sandia Base (now Kirtland East) because of an acute housing shortage in the Albuquerque area. Housing was owned by the Atomic Energy Commission (AEC) and managed by Sandia. A three-bedroom house with fireplace could be rented for $71. In 1949, the annual payroll was $8.4 million.

Sandians relaxed on the base as well. The Coronado Club opened in June 1950, with facilities including a restaurant, swimming pool, outdoor patio and fireplace, ballroom, cocktail lounge, and various recreational and meeting areas.

Paving and storm drainage programs in the Tech Area got under way in June 1950. Bldg. 892, known as the Road Building, was completed in 1951 and incorporated the latest developments in architectural and construction engineering of the time.

Many early Sandians were sports-minded. More than 1000 employees participated in organized team-event sports in 1953.

The Joint Chiefs of Staff visited the Labs in 1953. Sandians pledged $38,904 to the Community Chest. Sandia Corporation President Donald Quarles was appointed US Assistant Secretary of Defense in Charge of Research and Development. Three Sandia scientists volunteered to assist a new Albuquerque medical research group establish a radioactive isotope laboratory and study heart disease.

In 1954, Sandia installed a 35mm camera capable of photographing aircraft at a distance of 100 miles. The Sandia Colloquia Series was launched that same year. Sandia also earned the first AEC Safety Award of Honor for industrial safety.

Life in the US

In 1949, the XB-4 plane went cross-country in 3 hours and 46 minutes, a two-stage rocket soared to a record 250 miles at 5000 mph above White Sands Proving Grounds, Whittaker Chambers accused Alger Hiss of spying, and Carbon-14 was first used to determine the age of objects. George Orwell's *1984* was published.

In 1950, tritium was discovered in ordinary water. The first kidney transplant was performed. Klaus Fuchs was found guilty of treason. A round-trip flight on North American Airlines from New York City to California cost $88. Television shows premiering in 1950 included the "Kate Smith Hour," the "Jack Benny Program," and "What's My Line?"

In 1951, Ethel and Julius Rosenberg were found guilty of treason and sentenced to death. Glenn Seaborg won the Nobel Prize in chemistry for the discovery of plutonium. "I Love Lucy" premiered on TV.

In 1952, Elizabeth II was crowned Queen of England. The heart-lung machine was developed, and RCA developed bean-sized transistors to replace vacuum tubes. Fiberglass first appeared in 1952.

In 1953, the structure of DNA was determined, the first atomic shell was fired at the Nevada Training Ground, and Chuck Yeager flew 1600 mph in the X-1A. Corvettes made their appearance, at $3250!

In 1954, Linus Pauling won the Nobel Prize in chemistry, and the public was warned about the dangers of radioactive wastes. Strom Thurmond of South Carolina was the first US Senator to be elected by write-in vote. The first color TV was marketed at a cost of $1000, and couch-potato cuisine (frozen TV dinners) became available. •JW

But Set It Straight After Dinner

Manhattan haberdasher Paul Stuart designs shirts with a side loop for use during meals to help men keep their ties out of the gravy.

Lynn Asinof, *Wall Street Journal*

Fast and Fault-Tolerant

STARLOC Is Step Forward in Technology For Target-Recognition Computers

Designers of today's high-tech weapons try to augment or replace human operators with computer systems whenever possible. But it's been hard to make a computer that recognizes targets with the speed, accuracy, and reliability that's required. Now, Sandia researchers at Livermore have taken a step forward in solving this problem by developing a prototype of an on-board target recognition computer.

Dubbed STARLOC (Sandia TARget LOcation Computer), the prototype computer grew from an idea originated about two years ago by Leonard Napolitano and Don Sweeney (both 8435). Their concept is based on earlier research by George Schils (8435) and Don in 1984-86 (LAB NEWS, Aug. 15, 1986) on optical processing of lock-and-tumbler filter algorithms for automatic target recognition.

"There are always concerns about how portable or 'fieldable' a system based on an optical computing system will be," Leonard says, "so to build STARLOC, we came up with a digital system to do the same calculations. It's really complex. For every image frame you receive, you have to do about a hundred million floating-point calculations to produce the output — a very computationally demanding algorithm."

A target can be a solid object, a rocket plume, or an electrical signature.

The effort began with a small study group — including Leonard, Phil Bryson (8134), John Leeper, and Kyle Berry (both 8432) — looking at the feasibility of building such a computer. Among their considerations were the algorithm, the architecture of the computer, and design requirements for higher reliability. They used the latest computer-aided design and manufacturing tools to design a reduced-scale prototype.

Computer Bypasses Failures

Leonard says they also wanted to include fault-tolerance features to increase the computer's reliability. "That meant designing a computer that knows when its components break down, so it can reconfigure itself in real time to work around any failed parts and still do its job," Leonard explains. "The study group worked for about four months and came back with a preliminary proposal about what could be done and how many people it would take. We then got the go-ahead to build the prototype we had recommended."

This first-generation computer incorporated all the functions and all the components of a full-scale unit, but the reduced size did not allow it to be as fast.

The group has now started second-generation design. By taking advantage of the latest improvements in integrated circuit technology, they expect to substantially reduce the size and power required and yet increase the computational performance.

"Our prototype has 40 megaflops [million floating-point operations per second], which puts it in the supercomputer performance class," says Leonard. "Our new design will be at least 20 times faster. Of course, the machine is tailored for a specific application and doesn't have all the functionality of a general-purpose computer. We've designed it to do this one particular operation."

'Super Templates' Save Time

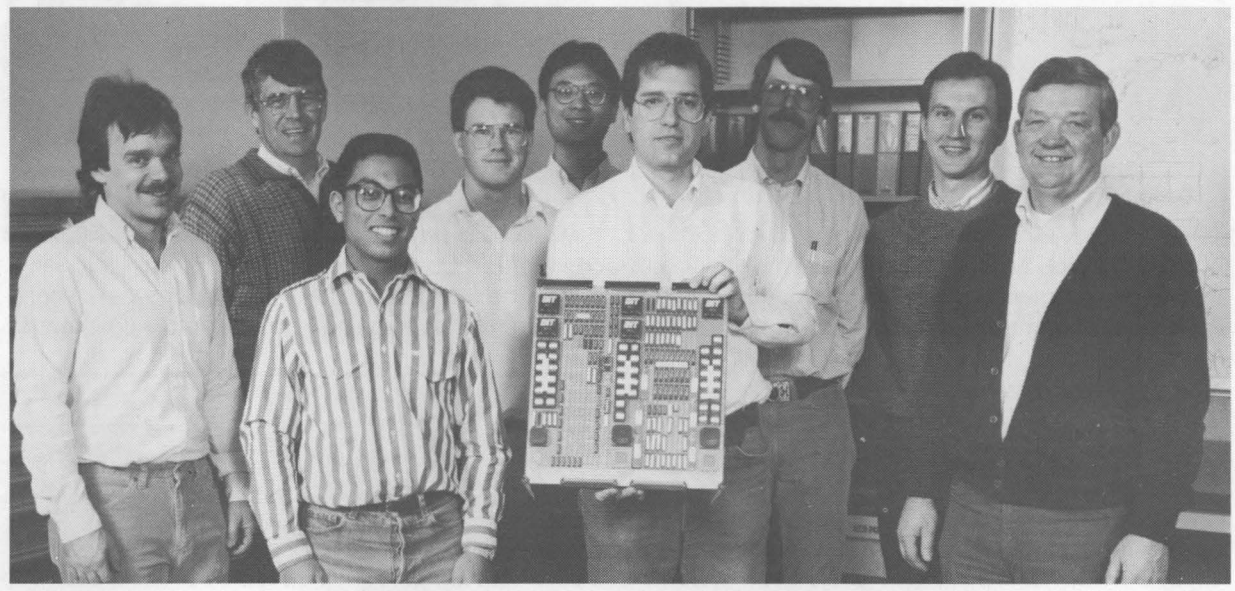
The lock and tumbler algorithm used by STARLOC is based on a generalization of the template-matching method (the template being a carbon-copy image of the target). The template stored in the computer's memory is computationally laid over a computer representation of an input image.

In the ordinary template-matching method, a computer must check hundreds or even thousands of templates against the input image to account for rotations and other variations in the target's appearance. The lock-and-tumbler algorithm mathematically combines all these templates into "super templates." Only 10 to 20 of the super templates are needed to check the input image.

The input image can be any type — a radar image, a video image, or an SAR (synthetic aperture radar) image. A target in the image can be a solid object, a rocket plume, or just an electrical signature with a definable pattern. In the lab, scale models are used as targets, with three-dimensional landscape and camouflaging on a tabletop layout.

In a related effort, four members of the team developed a new microchip called an EDOC (Error Detection Or Correction) chip. When the data are sent through the STARLOC computer, an attached code word verifies that none of the bits has been changed, or, if changed, that the chip makes the necessary corrections to ensure that accurate data are presented to the computer's processors. A patent application for the EDOC chip has been filed with DOE.

Leonard credits Rick Wayne (8400) and John Vitko (8430) for having enough faith in the team to allow it to stretch its skills and develop the technology base when success was uncertain. Also working with Leonard on the project have been David Andaleon (8432), Jim Cardinal (8435), David Ching (8155), Bill Shreeve (8453), former Sandian Spencer Klapp, and Prof. Bob Redinbo, a consultant in the fault-tolerance field from UC Davis. •BLS

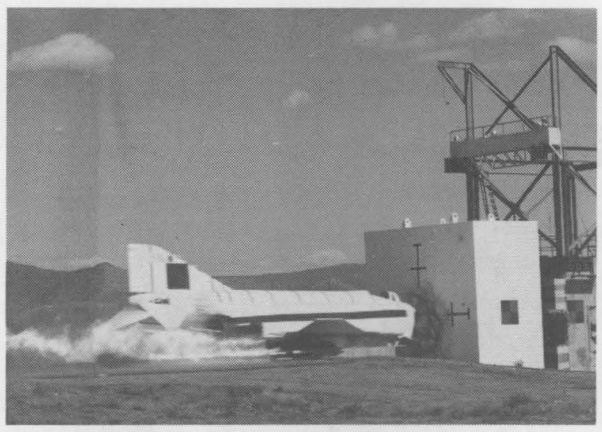


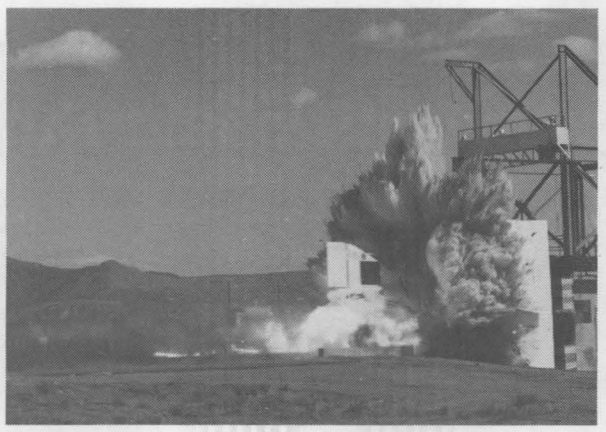
STARLOC TEAM members are (from left) Jim Cardinal (8435), Bob Redinbo (UC Davis), David Andaleon (8432), Spencer Klapp (former Sandian), David Ching (8155), Leonard Napolitano (8435, holding one of the two original prototype processor boards), Phil Bryson (8134), Kyle Berry, and John Leeper (both 8432).

SANDIA LIVERMORE NEWS

VOL. 41, NO. 16 SANDIA NATIONAL LABORATORIES August 11, 1989

THREE PUERTO RICAN visitors from the Ana G. Mendez Educational Foundation spent two weeks in July at Sandia, Livermore, under DOE's Science and Technology Alliance program. The Alliance brings together three national labs (Oak Ridge, Los Alamos and Sandia) and three educational institutions (North Carolina A&T, New Mexico Highlands University, and the Ana G. Mendez Educational Foundation). Its purpose is to introduce minorities to scientific and engineering fields at the national laboratories, thereby encouraging continued education in science and technology. Shown on the tour of Sandia's computing center are (from left) Mel Lagasca (8236); Denise Robinson (8526); Puerto Rican students Mariela Simmonet and Luis Guadalupe, and high school instructor Carmen Lopez, all with the Foundation; and David Rosenzweig (8522).





GOING, GOING, GONE — Sequence shows rocket sled test of F-4 Phantom jet aircraft as it slams into a one-million-pound block of concrete. The first-of-its-kind test was designed to help researchers estimate the effect of an aircraft crashing directly into a nuclear power-plant structure. A 70-mm framing camera running at 125 photos per second froze the action. (Photos courtesy of Photometrics and Optical Development Div. 7556)

(Continued from Page One)

Crash Test

"As it turns out, Sandia is the only place in the world with the unique combination of facilities to conduct a test of this magnitude," says Bill Snyder, Director of Exploratory Nuclear Energy Systems 6500. "We are very excited about the test's outcome. Our results should have a profound effect on nuclear power-plant safety."

Getting ready for the aircraft-impact test involved some out-of-the-ordinary preparation, recalls Dave Bickel, supervisor of Track and Cables Div. 7535:

"To keep the thing from lifting off during the test, we added support struts to the special carriage that would carry the plane down the track."

"First, we acquired a flyable F-4D. Then, to keep the thing from lifting off during the test, we added support struts to the special carriage that would carry the plane down the track. We also placed the plane at a nose-down attitude of one degree to counteract the lift."

A two-stage rocket system propelled the aircraft as it sped toward the target — a 23-ft.-square, 12-ft.-thick block of concrete "floating" on a set of air bearings (air bags) so that impact force could be calculated from the measured movement of the target during the brief time the crash was in progress (see "Air Bearings Cut Friction Effects").

"Dave and his crew really came through for us by developing the air-bag concept," says Walt. "Without it, we wouldn't have been able to calculate the real impact force, because much of the impact force would have gone into overcoming friction, rather than into target movement. Using the air bags minimized the friction factor, allowing us to obtain very accurate target-movement measurements upon which to base our calculations."

"With the air-bearing system, you could move that one-million-pound block of concrete with less than 2000 pounds," says Dave. "With conventional bearings, it would have required several hundred thousand pounds."

The first stage of the system consisted of a pusher sled housing 36 super Zuni rockets. That sled was stopped by a water brake after rocket burnout 230 feet from launch. Five Nike rockets that were attached directly to the F-4 then ignited to accelerate the aircraft into the target.

"The rest of the plane was just rubble — we found pieces over a large area behind and to both sides of the target."

The 42,000-lb. F-4 struck the target dead-center at 480 mph. "A short portion of each wing tip and the tail sheared off at the edge of the target," Walt reports. "The rest of the plane was just rubble — we found pieces over a large area behind and to both sides of the target."

Twenty-four high-speed framing cameras with frame rates varying from 400 to 2000 frames per second recorded details of the impact sequence — and the deformation process. Ten accelerometers along the top of the F-4's fuselage and one on each engine measured deceleration during impact. Displacement, velocity, and acceleration of the concrete target were also measured.

"The test readings were excellent," Walt notes. "There was a good correlation between duplicate instruments measuring displacement and velocity. We now have actual experimental data on the impact force resulting from an aircraft crash."

Damage to the target was relatively minor. "That indicates that most of the impact energy went into movement of the target, which is what we'd hoped for," says Walt.

Besides Walt and Dave, the Sandia test team included Leon Parrish (now 6257), Brad Parks (6523), Ed Garavaglia, Steve Heffelfinger, Rob Tachau (all 7535), and Ted Blacker (1522). Ron Hill and members of his Photometrics and Optical Development Div. 7556 captured the test on film.

The Muto Institute researchers have also used the Sandia test data to validate their computer models, and now report a capability to accurately predict the test's impact force-time relationship. In a letter to then-President Welber, the president of Muto Institute expressed the Institute's assessment of Sandia's work: " . . . results achieved with full satisfaction. . . . We fully acknowledge the success of the tests owing to your positive effort and advanced technical expertise."

"That was high praise, coming from the Japanese," says Walt. "Obviously, they were *very* pleased with the data."

Details of the test results will be reported at the 10th International Conference on Structural Mechanics in Reactor Technology in Anaheim, Calif., next week.

●PW/KFrazier (3161)

Air Bearings Cut Friction Effects

Picture 10 good-sized balloons placed equidistant from each other under a short-legged, rectangular table. At some moment, the balloons are inflated simultaneously, causing the table to "float" above the floor.

The air-bearing system under the concrete target used in the aircraft impact test (see main story) worked in somewhat similar fashion. Ten air bearings — oval-shaped air bags 43 inches wide and 67 inches long, made of abrasion-resistant urethane — were placed equidistant along the length of the target (front and back) in slots in the bottom of the concrete target.

The air bearings have a flexible diaphragm that's sealed around the circumference and attached to the center of a top plate. Air flow supplied to the bearing inflates the diaphragm and passes through communicating holes in the diaphragm to the space below.

Thus, during the test, a continuous air film was formed between the air-bearing diaphragms and the underlying support structure, in effect "floating" the target above and allowing virtually friction-free movement.

Crash Tests of '77 Recalled by F-4 Impact Test

Full-scale crash tests using actual vehicles (see main story) first made their appearance on the scene at Sandia's rocket sled facility in 1977.

"Spectacular" became a byword in Area III that year, when four full-scale tests on nuclear material shipping containers captured the attention of the national media, including the likes of Jules Bergman (now deceased), former science editor of ABC-TV. Bergman did on-the-spot coverage of at least two of the tests, which were designed to evaluate the effectiveness of analytical tools and scale-model tests for predicting damage in real-accident conditions.

Each of the first two '77 "crash tests," as they came to be called, involved a 22-ton shipping cask mounted on the beds of tractor-trailer rigs that sped down the track (at speeds of 60 and 84 mph) and slammed into a concrete wall weighing 690 tons. The tractor trailers didn't survive, but the cask did — "slightly deformed as predicted, but with basic integrity unimpaired" — reported Bob Jefferson (ret.), then-manager of Sandia's Nuclear Fuel Cycle Technology Development Dept.

Simulated Grade-Crossing Accident

The third test in 1977, to simulate a grade-crossing accident, placed a 28-ton cask atop a tractor trailer supposedly stalled on a railroad crossing (complete with the familiar crossing signs). Meantime, a 120-ton locomotive traveling at 81.5 mph struck it broadside. Again, the cask withstood the pounding.

The last dramatic test that year featured another head-on crash into the 690-ton concrete wall — this time of a special railcar carrying a 74-ton fuel cask at a top speed of 81.4 mph. The front of the railcar was demolished, but the massive cask was essentially undamaged.

The '77 crash tests were one more demonstration of Sandia's unique rocket sled testing capabilities, made possible by unusual equipment and facilities. In addition to the 2000-ft.-long sled track that's used for full-scale impact testing, there's also a 10,000-ft.-long track used for high-velocity tests. The latter facility has a narrow gauge to minimize mass and frontal area, thus reducing propulsion requirements.

Equipment at the facility includes pneumatic sleds that can eject 2500-lb. payloads to altitudes of 250 feet, and a 20-by-40-ft. flat-plane sled for investigating tornado injection — that is, how objects get picked up by tornado winds at speeds as high as 300 mph.

The highest speed ever achieved during a rocket sled test? "About 6600 feet per second, or 4400 mph," reports Dave Bickel, supervisor of Track and Cables Div. 7535.

And the most exciting test? "The next one."

(Continued From Page One)

Partnership

Wildenthal, Dean of Arts and Sciences; James Thompson, Dean of Engineering; Nasir Ahmed, Chairman of Electrical and Computer Engineering Department; and Marcus Price, Professor of Physics and Astronomy.

Fortifying Faculty

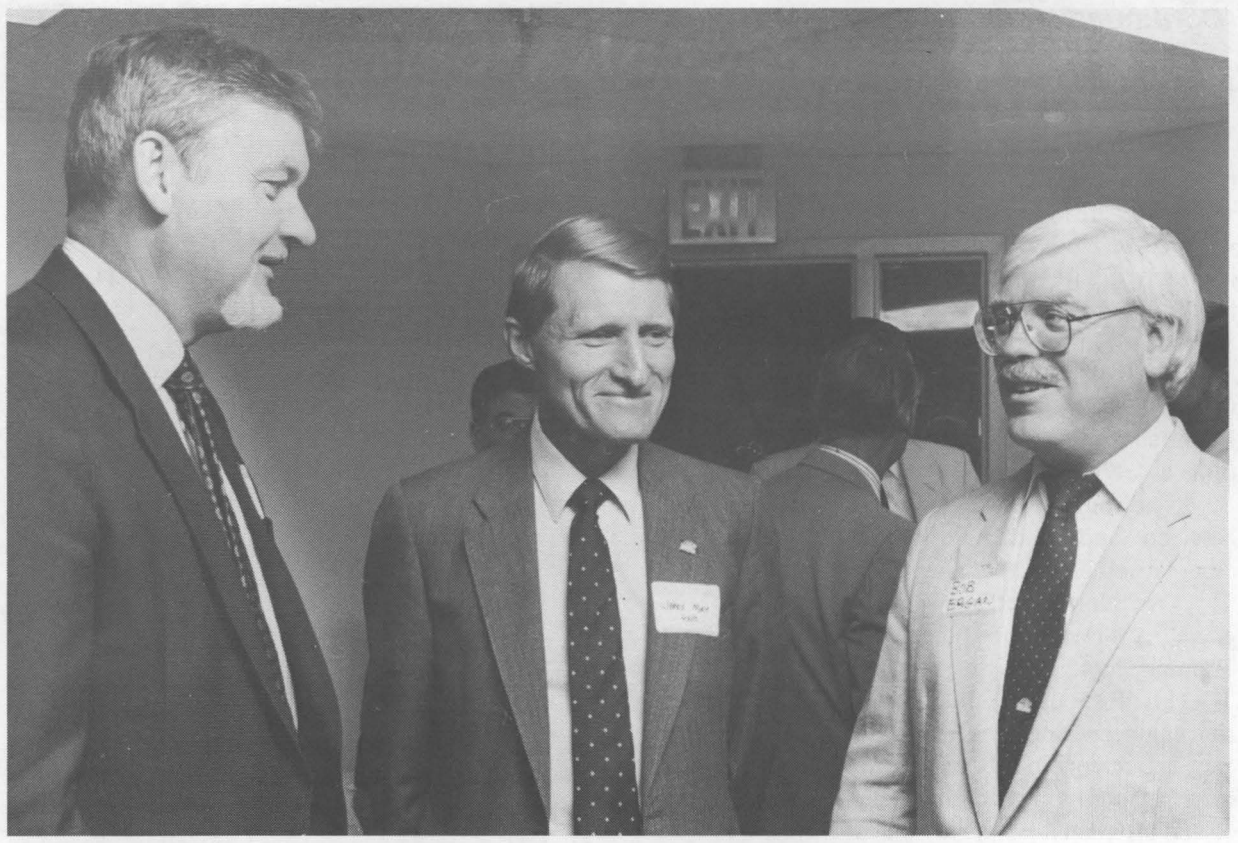
One successful area of interaction between Sandia and UNM, as well as other universities, is the Sandia-University Research Program (SURP). Funded by Sandia, SURP is a faculty development program through which new university faculty members can obtain research contracts.

"The contracts are really 'seed money' — enough to put faculty members who've been on the staff less than two years in stronger positions to obtain research grants from traditional funding sources," notes Jim Schirber, who has chaired the SURP Committee for more than a decade. "They carry out joint-interest research projects on campus.

"Thomas Bein, who began his work at the University with a research contract from Sandia and later collaborated with Jeff Brinker [1846] in a joint proposal to the National Science Foundation, is a good example of how SURP helps promising UNM researchers get started — and benefits Sandia as well." (See "A Successful Sandia-UNM Collaboration.")

SURP funded 17 contracts last year: 9 at UNM, 3 at NMSU, and 5 at New Mexico Tech.

"SURP helps universities upgrade their staff, which, in turn, helps Sandia," notes Bob Eagan. "We look to the universities both for new employees and for the continuing education of our staff. The better the universities are, the better their graduates will be — and the better Sandia and the Albuquerque community will be."



PRESIDENT AL NARATH (left) and UNM President Gerald May spoke recently at the meeting of the UNM/Sandia Joint Working Group on Education, chaired by Bob Eagan (right), Director of Materials and Process Sciences 1800. Both presidents stressed the importance of strengthening the ties between Sandia and UNM. The day-long conference was coordinated by Debbie Eaton and Rose Ann Poloncasz (both 3511).

And there are other spin-offs and extended collaborations. Frank Williams, chairman of UNM's Chemical and Nuclear Engineering Department is a case in point. "He was a SURP recipient years ago and continues to interact strongly with Sandia scientists and technical organizations," notes Bob.

Another area of strong interaction is the Joint Appointment Program through which Sandia partially supports new faculty at UNM. The goal of this program is to attract new people to tenure-track positions at UNM through three-year appointments that include part-time research at Sandia.

"Participants in this program," Bob explains, "are members of the University faculty, teaching and working in areas of mutual interest to UNM and Sandia. We're looking right now at extending the

(Continued on Page Six)

Case History

A Successful Sandia-UNM Collaboration

Back in January 1986, when Jeff Brinker (1846) met Thomas Bein, now with UNM's Chemistry Dept., he didn't know they would eventually team up in a collaboration that would be mutually beneficial — to themselves and to their institutions.

An important result of their collaborations was their development of novel sensor surfaces that have a variety of potential applications.

"I met Thomas while teaching a short course on sol-gel processing at DuPont back in Delaware," says Jeff. "At the time, he was a post-doc interested in getting a job, and he talked with me about UNM-Sandia interactions. He was very interested in the types of collaborations that might be established between the University and the Labs.

"In the spring, when he came to interview at UNM, he spent half a day with me and other interested Sandia staff, discussing interactions between Sandia and UNM.

"By that time, he'd already written a SURP [Sandia-University Research Program] proposal, based on our discussion at DuPont. So, soon after he joined the UNM faculty, Sandia began funding some of his work.

"Then in December, we submitted a joint proposal to the NSF [National Science Foundation] that was funded in October 1987."

Agreeable Differences

The proposal was successful, Jeff says, because it brought together two very different areas of expertise. "Our proposal was funded by NSF's Materials Chemistry Initiative, a new NSF program that promotes science and engineering at the interface between chemistry and materials science. The intent is to bring together people with different backgrounds.

"Thomas's area of expertise is in the synthesis and characterization of zeolites — crystalline alumino-silicate framework structures whose atoms create channels that can hold other atoms much as a sponge holds water. He's also expert in a number of analytical techniques for understanding what's going on in terms of the science behind the processes we are interested in.

"In contrast, I'm involved in sol-gel processing, where we start out with inorganic or metal-organic precursors in solution and form polymers, or gels. These systems can be used to make bulk materials that are useful for, among other things, catalyst supports and controlled-pore glasses. They can also be used to make thin films that are useful for protective, optical, or sensor coatings."

The basis of their joint proposal was to use Thomas's expertise in zeolites and Jeff's expertise in sol-gel processing to embed zeolite structures in a sol-gel thin-film matrix to produce composite films that can be used as novel sensor surfaces.

"We're currently exploring a number of potential applications for these sensor surfaces," says Jeff.

Out Of Small Beginnings . . .

Jeff's collaborations with Thomas and another UNM staff member, Doug Smith (Chemical Engineering Dept.), were just a few of many such collaborations taking place at UNM at that time, he says.

"Collectively, these kinds of interactions had a large impact. It was, at least in part, because of these collaborations that the topic of micro-engineered ceramics was selected as the technical thrust of the NSF center of excellence then being developed at UNM.

"And, once it was established, the Center for Micro-Engineered Ceramics, in turn, attracted more people with a strong interest in materials science to UNM, strengthening and expanding the university's faculty in that area.

"So what we have is a number of small collaborations — not particularly impressive in themselves — that, collectively, became the catalyst for an expanded program in micro-engineered ceramics."

Narath, May on Sandia-UNM Relationships

Sandia President Al Narath and UNM President Gerald May recently reaffirmed the importance of improving an already good relationship between Sandia and UNM. Speaking at a conference sponsored by the UNM/Sandia Joint Working Group, both noted positive changes in the evolving relationship between Sandia and UNM.

"I'm very pleased to see the obvious progress that has taken place over the last five years in the interactions between Sandia and UNM," Al said. "I'm taking a personal interest in our interactions and getting personally involved in exploring ways to improve them."

May compared today's climate of Sandia-UNM interactions with that of 10 years ago:

"Today, I see an atmosphere of genuine cooperation, not only in the way that Sandia continues to support the Sandia-University Research Program, but also in the way that Sandia can now reach out to technical experts on our campus who have something to offer the Labs — and in the way that we are now writing joint proposals and working together with joint appointments. Ten years ago, these were things we only dreamed about."

(Continued from Page Five)

Partnership

program to other universities in New Mexico."

A new area of interaction involves a jointly developed In-Hours Technical Education (INTEC) course that will be taught at Sandia and, in modified form, at UNM. Dubbed "Design for Manufacturability," the course is being developed by Belinda Holly, Wayne Trump (both 3522), Jack Gallagher (2545), and Joe Mullins, Director of Manufacturing, Engineering, and Industrial Relations at UNM.

"The course is designed to improve teamwork between Sandia and DOE production agencies and other customers and suppliers," says Belinda.

"We think this course will be an ideal joint program," says Danny Brown, manager of Education and Training Dept. 3520.

"It will strengthen the capabilities of Sandia design engineers, engineers in DOE's production agencies, and many others. And it will be used by UNM in its Manufacturing and Engineering Program as part of that program's efforts to address the US's loss of competitiveness."

"The JWG will encourage more interactions like the development of this course," says Bob Eagan. "It's a prime example of how cooperation between Sandia and UNM can be mutually beneficial and also have positive effects that go beyond both institutions." •DR

Joint Working Group Active Since 1983

A Joint Working Group (JWG) that would concentrate on strengthening ties between Sandia and UNM was the brainchild of Dick Schwoebel (2500), John Cantwell (3150), Maureen Baca (3510), and Mike Rex (3521).

"We began working on the idea in 1983," says Dick, then chairman of the University Programs Education Committee (UPEC). "Our goal was to identify areas of mutual interest and to develop plans for enhancing interactions in those areas."

They proposed the idea to UNM President Gerald May (then Dean of the UNM College of Engineering) and other officials at the University, and the JWG was officially established in the fall of 1984.

Expanded Options

One of the group's first accomplishments was the Special Microelectronics Masters Program (SMMP) at UNM in which BS-level candidates earn masters degrees appropriate for Sandia's microelectronics R&D. Before the UNM program, only a few schools — Stanford and UC Berkeley, for example — were approved for the Sandia program, which requires a special curriculum and facilities, says Dick.

"One of the major problems for Sandia had been the low retention rate of employees who had attended the California schools. They often left the Labs and joined firms in the Silicon Valley. By working to qualify UNM as one of the schools in the program, we reduced the cost of the program and helped retain a higher proportion of SMMP graduates."

Another improvement inspired by the JWG involved streamlining the means for transferring to universities equipment that no longer meets Sandia's needs and would wind up in Reclamation. "This helps university departments that have small equipment budgets," notes Dick.

Other projects include developing the Joint Appointments Program through which Sandia helps attract new tenure-track faculty to UNM and other state universities by funding joint-interest research contracts; arranging for Sandians to teach graduate-level courses at UNM in areas of special interest to Sandia; stimulating the development of an Instructional Television Program (ITV) that now transmits more than two dozen courses to the Labs; and forming a statewide ITV Working Group that includes representatives from the state's national labs, universities, and industries.

The monetary value of Sandia's contributions to higher education in New Mexico, including contracts for research and service, equipment, and temporary employment totaled about $7 million in FY87, Dick says.

Dick chaired the UPEC (now the Degree and Certificate Program Committee) and the JWG until last fall, when he passed along both tasks to Bob Eagan (1800). He now chairs the Continuing Professional Development Committee. Both committees serve under the Sandia Education Committee, chaired by Glen Cheney, Vice-President of Component Development 2000.

Take Note

The UNM Centennial Committee, the Anderson Schools of Management, and several area banks are co-sponsoring an all-day business symposium, "Management Skills for Continued Growth," Sept. 8 at the UNM Continuing Education Building. William Brock, former US Senator and Secretary of Labor during the Reagan administration, will give the keynote address. The $20 registration fee includes workshops and lunch. Preregistration is requested. Contact Karen Shane (3163) on 4-3268 for information and registration forms.

* * *

The New Mexico Chapter of the American Vacuum Society is offering two courses in vacuum science and technology Sept. 19-22 at the Ramada Classic Hotel. William Rogers (1114) and former Sandian Warren Taylor are among the instructors for the course in basic vacuum technology. The second course is on operation and maintenance of vacuum pumping systems. Either course is subject to cancellation if sufficient registration is not received by Sept. 12. For registration information and forms, contact Gerald Nelson (1823) on 4-5200.

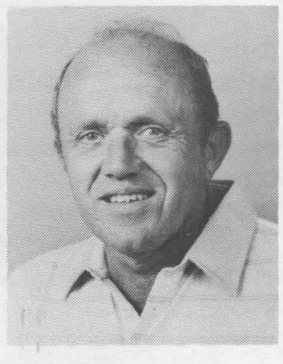
* * *

Retiring and not shown in LAB NEWS photos: David Gomez (3425), Darlene Welch (154), Ira McKinney (1163) and Leonard Parsons (7264).

Retiring

Jim Rogers (400) 35

Thomas Starr (7265) 35



Bill Hoffman (7137) 29

Sympathy

To Fran Sanchez-Conroy (9110) on the death of her father in Santa Fe, July 13.

To Larry Rollstin (1555) on the death of his father in Iowa, July 15.

To Rafael Torrez (3426) on the death of his father in Las Nutrias, N.M., July 15.

To Jean Sherlin (2826) and Jo Ferrell (5231) on the death of their mother in Las Cruces, July 24.

To Linda Worden (5140) and Paul Garcia (7473) on the death of her father and his brother-in-law in Albuquerque, July 25.

To Eddy McClain (3426) on the death of his sister in Thompson, Ga., July 26.

WILLIAM SCHEERER (center), Executive Director of Product Realization and International Planning at AT&T Bell Laboratories, Holmdel, N.J., visited Sandia recently. Here he talks with Doug Weaver, manager of Facilities and Process Development Dept. 2130 (left), and Jack Wirth, Director of Electronic Subsystems 2300, before touring the Microelectronics Development Lab. Scheerer's visit included a presentation to Small Staff about "Implementing Quality in the R&D Environment."

feedback

Q. I applaud President Narath's decision to discontinue the distinction between Sandia's Livermore, Albuquerque, and Tonopah locations. However, by the same logic, I think the continued use of the plural, Sandia National Laboratories, unnecessary. Why is it plural?

A. The word "Laboratories" in Sandia's name does not refer solely to multiple locations, as you infer in your Feedback. According to an explanation published when the new name was selected:

"The term Sandia Laboratories is not used simply to point out that several sites are involved. It is used to emphasize the existence of many laboratories devoted to a wide range of scientific disciplines — physics, chemistry, materials, testing, etc."

No doubt, selection of the name was influenced by the term "Bell Laboratories," which continues in wide use today.

The term "Sandia National Laboratories" is also recognized by the Act of Congress that designated us a "national" institution.

Herb Pitts — 3100

Q. Our medical claims form includes as many as five places for an employee's signature. Is such redundancy really necessary?

A. Each signature on the medical claims form has a different function. Signatures on the front side are required to protect Sandia against fraudulent claims; those on the back side protect the insured and patient from an unauthorized release of personal information and permit the convenience of assigning benefits to a provider.

Signatures on the front side attest that information provided is true and correct. If the claim is for an individual other than the employee, the patient must also sign. (More than half the claims filed are in this category.) If the patient is the employee, "same" can be written in the second signature block. If you are filing a simple claim — for example, for prescriptions or for minor treatment during office visits — Provident would process the claim with only these signatures.

The first set of signatures on the back side allows Provident to obtain any information it needs to complete your claim; if you do not sign this block, your claim might be delayed until Provident receives your permission to obtain additional information. The final signature block on the back is signed only when you want the payment to go directly to the doctor; if you paid your doctor directly, this block would not be signed.

Ralph Bonner — 3500

Q. I recently attempted to execute some transactions concerning AT&T and "Baby Bell" stocks with American Transtech. The transactions required a guaranteed signature, which I obtained at the Sandia Labs Credit Union — the only banking institution at which I am known. American Transtech refused to honor the signature because SLFCU was unknown to it. SLFCU then attempted to follow the procedures necessary for recognition by American Transtech, but was unsuccessful because Transtech doesn't want to deal with credit unions ("If we were to recognize SLFCU, then we would have to deal with any credit union"). The only credit union Transtech recognizes is the one associated with US West.

Since so many Sandians have these stocks and deal mostly with SLFCU — and particularly since we are AT&T employees — I think that American Transtech should recognize signatures guaranteed by SLFCU.

A. We spoke with Christopher Jillson, Senior Operations Manager at the Sandia Laboratory Federal Credit Union (SLFCU) regarding signature guaranties. He informed us that SLFCU is in the process of providing the necessary credentials to American Transtech to establish recognition for signature-guaranty purposes. Call Mr. Jillson on 4-4555 for additional information.

Ralph Bonner — 3500

Medical Corner

Mental Health Roundtable To Discuss Separation, Divorce Process

The process of separation and divorce is a major source of stress and frustration. The people involved usually draw battle lines and begin fighting bravely (sometimes not so bravely) for what they believe is rightfully theirs — their children, their finances, their possessions.

As they become involved with the court system, they often feel exasperated and confused. Each person has a different idea of right and wrong. Each has ideas about how the court should operate, and expectations of what the court can and cannot do. Unfortunately, things don't always work out according to expectations. Both parties may feel disappointed and cheated, and the result can be even more disillusionment and fear.

To help Sandians better understand both the emotional and the legal processes, Albuquerque clinical psychologist Virginia Malone will present "Personal Divorce, Legal Divorce, and This Little Piggy Cried All the Way Home." She works with couples and the court system, and will discuss divorce as viewed by the legal system and by the individual.

Her presentation is part of the Mental Health Roundtable series. The 45-minute presentation will take place at 12 noon, Aug. 22, in Bldg. 815 (outside the tech area).

Sandia clinical psychologist Arlene Price (3300) coordinates the series. •

Congratulations

To Nickalee and Joseph (1523) Jung, a son, Thomas McCauley, July 11.

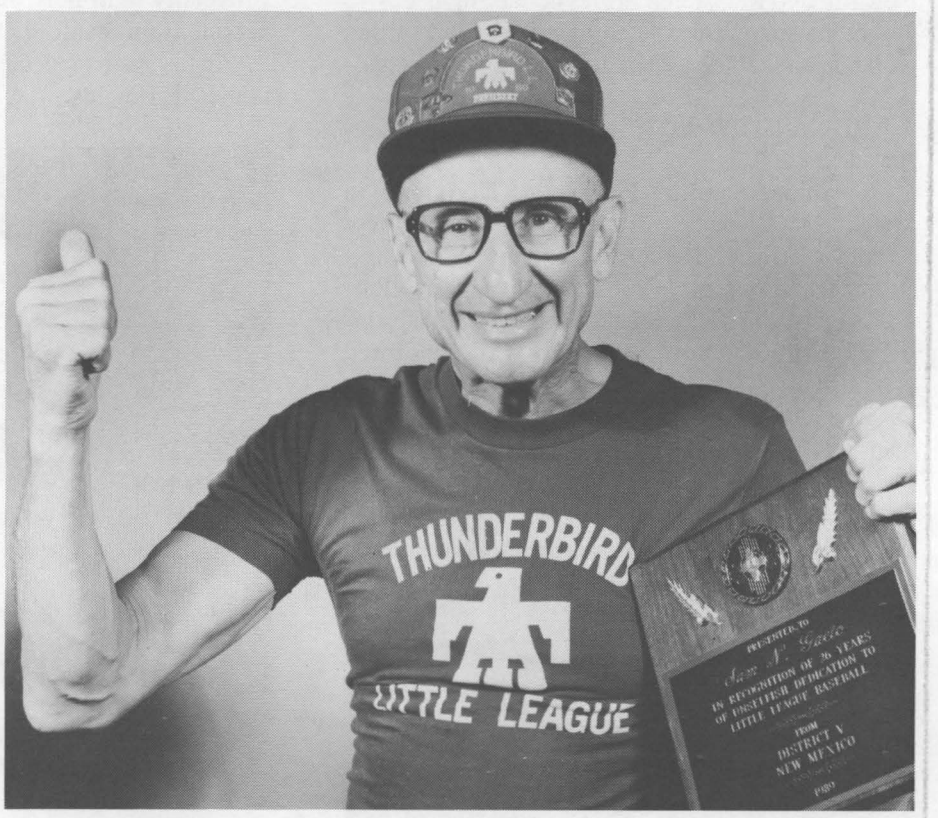
Sympathy

To Wendy Falls (7525) on the death of her grandmother in Pennsylvania, July 28.

To Charles Vigil (3426) on the death of his grandfather in Albuquerque, July 30.

To Michael Hess (2826) on the death of his father in Phoenix, July 31.

ALMOST 100 BLACK COMMUNITY LEADERS and 77 mid- and high-school students from the Albuquerque area participated Aug. 2 in Summer Student Day. Purpose of the day-long event was to acquaint the visitors with Black student programs at Sandia, according to Patricia Salisbury (3511), chairperson of the Labs' Black Outreach Committee. As part of the day's activities, students in the 1989 Summer Student Program made technical presentations on their work to their colleagues and supervisors. Here, Rashaunda Henderson, who's been assigned to Intrusion Detection Systems Technology Div. 5249 this summer, prepares to launch her presentation on the operation of a video-motion-detector data collection system. Rashaunda attends Tuskegee Institute (Ala.) during the school year.



HE'S OUTA THERE! Sam Gaeto, an '86 retiree, recently retired again — this time as volunteer leader of the Thunderbird Little League, which covers parts of Albuquerque's Northeast Heights. Sam helped found the League in '64 and has since served in various official capacities, including president, vice-president, treasurer, manager, umpire, and advisor (the title they give you when you get old, he says). Sam estimates that about 12,000 boys and girls have participated in the League during the 26 seasons he was involved. The League fields at Bryn Mawr and Comanche NE were named "Gaeto Fields" in '75 in honor of his long service, but he wasn't even half through at the time. The plaque that Sam holds was presented to him on July 26 by the District Five Little League of New Mexico in honor of his 26 years of service to Little League.

Supervisory Appointments

GARY FERGUSON to manager of Solid State Components Dept. 2530.

Gary joined Sandia in February 1969 as a member of the Fuel/Air Explosive Development Division, where he supported system flight testing. His work included design of the W-74 secure container system. From August 1971 to January 1972, he was on special assignment with the Defense Special Projects Group in Washington, D.C.

He joined the Exploratory Systems Division in 1972, and was project engineer for the Tiger-II program, the extended range bomb, and the fast-sink-rate depth bomb. In 1978, he transferred to the Components Division and was component engineer on the MC3444 environmental sensor, SWERVE II Elevon Control System, and wireless exclusion region stronglink programs.

He was promoted to supervisor of the Special Projects Division in 1985. He transferred to the Sensor Components Division in 1987, and was acting manager of the department he now heads from September 1987 until his promotion.

Gary has a BS in mechanical engineering from the University of Texas and an MS in the same field from Stanford University. He's a member of the American Society of Mechanical Engineers, the International Society for Optical Engineers, and is a New Mexico Registered Professional Engineer.

In his spare time, he enjoys skiing and sailing with his wife Coleen. They live in the SE Heights.

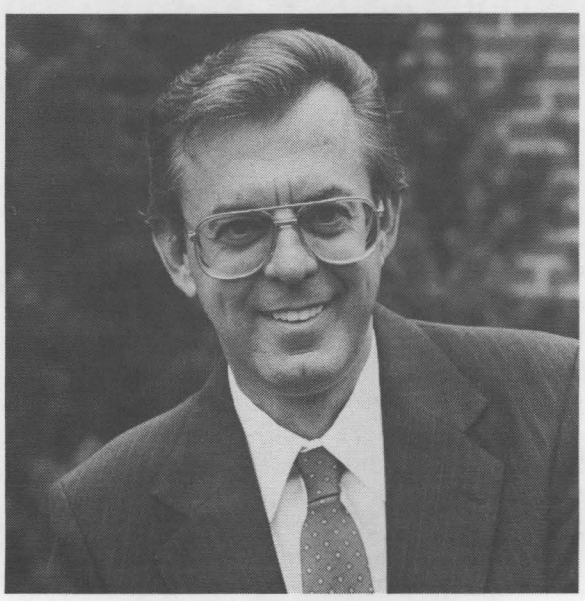
* * *

EDWARD KOZLOWSKI to assistant to the Vice-President 1000.

Ed joined Sandia's Purchasing Division F in March 1984, where he was a Sandia Contracting Representative (SCR). He helped develop Purchasing's Just-In-Time system. In 1986, he transferred to Purchasing Division 3712, where he was the SCR supporting Orgs. 5000 and 9000. He was appointed administrative assistant to the Pulsed Power Sciences Director 1200 in March 1987, and was named Management Staff 400 chief of protocol in September 1988.

He has a BS in management from Indiana University, an MS in personnel/human relations from the University of Oklahoma, and an MS in procurement from Webster University. He teaches purchasing and management at the College of Santa Fe.

Ed enjoys playing racquetball in his spare time. He and his wife Sandra have two children and live in NE Albuquerque.



EDWARD KOZLOWSKI (1000)

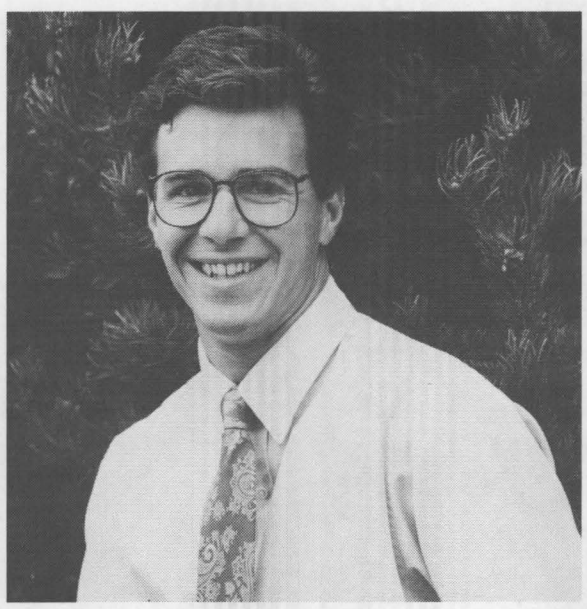
GEORGE LAGUNA to supervisor of Sensor Components Div. 2533.

George joined Sandia in June 1971 as a member of the Active Ceramic Materials Division. In 1976, he transferred to the Flashblindness Protective Devices Division, where he helped develop techniques to manufacture and evaluate optical-quality lead lanthanum zirconate titanate (PLZT) wafers.

He initiated development of a programmable spatial light modulator, a device used in a 3-D topographic optical mapping system. George joined the Crystal Components Division in 1986, where he was project leader for development of a solid-state Coriolis-force-based rotation sensor. He was acting supervisor of the division he now heads from September 1987 until his promotion.

He has an AA in mathematics from Arizona Western College, a BS in engineering physics from the University of Arizona, an MS in physics from the University of Illinois, and a PhD in electrical engineering from Stanford University.

In his spare time, George enjoys tennis. He lives in the NE Heights.



PAUL YOURICK to supervisor of Packaging and Shipping Section 3428-3.

Paul has been a member of Sandia's Shipping and Receiving Division since he joined the Labs in February 1984 as a hazardous-material-packaging engineer.

He has a BS in microbiology and public health and a BS in packaging engineering, both from Michigan State University, and is currently working on an MBA at UNM. He is a member of the Society of Packaging and Handling Engineers.

Paul's spare-time activities include softball, flag football, and skiing. He and his wife Joan live in the NE Heights.

MARIJO HINRICHS to assistant to Vice-President 6000.

Marijo joined the Labs in January 1986 as a benefits planner in the Benefits Planning and Pension Fund Management Division. She also worked as a pension and investment analyst in that division.

She has a BS in business administration, specializing in management and organizational behavior, from the University of Nebraska and an MBA in financial management from UNM. Before joining Sandia, she worked for Mutual of Omaha and Public Service Company of New Mexico.

Marijo is a member of the board of directors of Sandia Laboratory Federal Credit Union and a volunteer at the Albuquerque Rape Crisis Center.

Her spare-time activities include golf (she's president of the Sandia Women's Golf Assn.), volleyball, piano playing, reading, and writing. Marijo lives in the NE Heights.

* * *

JOSEPH ALLEN to supervisor of Utility Systems Div. 7811.

Joe has worked in the Facilities Directorate since joining the Facilities Design Division II in June 1967. His work has been in electrical design for construction and modification projects. Projects that he's worked on include the Particle Beam Fusion Accelerator II, the Live Fire Range in Coyote Canyon, and General Plant Projects at Tonopah Test Range.

He was project leader for the Facilities Computer-Aided Design/Drafting (CADD) System, and was responsible for creating, updating, and distributing the Facilities Engineering Graphics User Guide.

He has an AS in electrical technology from NMSU and a BS in electrical engineering from UNM. He's also done graduate study in EE at UNM. Joe is a charter member of the New Mexico Solar Energy Association and the Albuquerque Chapter of the Commodore Computer Users Group, and is a member of the International Intergraph Users Group.

In his spare time, Joe enjoys working with computers, reading, soccer, hunting, fishing, and photography. He also does volunteer work for the American Youth Soccer Organization. He and his wife Margie have three children and live in the NE Heights.

JOSEPH ALLEN (7811)

Second "Erwin Marx Award" for Sandia

Prestwich Wins Major Pulsed-Power Award

Ken Prestwich, manager of Pulsed Power Applications Dept. 1240, has received the Erwin Marx Award, which recognizes "outstanding contributions to the field of pulsed-power technology."

The award was presented at the seventh biennial IEEE Pulsed Power Conference, held in Monterey, Calif., recently. Ken is the sixth person to receive the award, and the second Sandian — Tom Martin (1290) received it in 1985.

"I'm very pleased to be recognized in this way by my colleagues," says Ken. "The award puts me among some outstanding people. Being at Sandia has given me the opportunity to do the kind of work that leads to an award like this. But everything we do here in pulsed power is a team effort, so really it's Sandia's pulsed-power team being recognized, not just me."

Pace VanDevender, Director of Pulsed Power Sciences 1200, says, "At the last Pulsed Power Conference, the keynote speaker noted three classic accelerators: Ian Smith's Aurora at Physics International Co., Tom Martin's Proto II, and Ken Prestwich's Hermes III. The Sandia leaders and their teams make us very proud indeed."

Venky Narayanamurti, VP-Research 1000, adds his congratulations: "External recognition is an important measure of the quality of our R&D. The Erwin Marx Award to Ken recognizes his outstanding contributions to pulsed-power technology. He has been one of the leaders of our accelerator technology of importance to AGT [above-ground testing] and weapon physics. My congratulations go out to Ken on this recognition."

Pulsed power is a technology associated with storing electromagnetic energy over relatively long times and delivering it in short, powerful bursts. Systems that use pulsed-power technology include particle-beam accelerators, high-power microwave sources, gamma-ray and x-ray generators, electromagnetic pulse (EMP) radiators, and electromagnetic launchers.

Ken specializes in high-peak-power accelerators and related systems. He has contributed to the development of about 25 systems, for purposes such as simulation of nuclear-weapon radiation effects, inertial confinement fusion, gas lasers, high-power microwaves, EMP, and research on potential beam weapons. He has made major contributions on several Sandia projects — including Hermes II and III, Nereus, SLIM, Proto I, LILI, Rayo, and RADLAC I and II.

Ken is one of Sandia's pulsed-power pioneers. He joined Sandia in 1962 and transferred in 1965 to a pulsed-power division that subsequently expanded into Pulsed Power Sciences 1200. His work has resulted in 64 publications.

DOE recognized Ken's sustained contributions to development of pulsed-power technology in 1983 by awarding him the Nuclear Weapons Program Award of Excellence. •

KEN PRESTWICH (1240), winner of the 1989 Erwin Marx Award in pulsed-power technology. Ken is looking over Hermes III, referred to by a recent Pulsed Power Conference keynote speaker as one of "three classic accelerators" — two of which are at Sandia (the other is Proto II).

Fun & Games

Biking — The third annual Chamber Orchestra of Albuquerque Turqoise Trail Bicycle Tour is set to roll Sept. 17 from the Four Hills Village Shopping Center (Central & Tramway NE). The 70-mile tour to Madrid and back (or any portion thereof, depending on ability or inclination) starts at 8 a.m.; check-in tables open at 7:30. Rest stops with refreshments and sag wagons will be available. Register early to be eligible for prizes. Prize winners will be selected from registrations received before Sept. 17 and will be announced at the starting tables the morning of the ride. Contact Walt Joseph (ret.) on 299-6989 for information and to find out where to obtain registration forms.

* * *

Bowling — You don't have to be associated with a Sandia-sponsored league to attend tonight's SANDOE Bowling Association Bowler-of-the-Month Awards and membership drive at 5 p.m. at the Coronado Club, Eldorado Room. Officers will be elected and by-laws reviewed. Refreshments will be served.

SANDOE bowlers competed in the 1989 18th Annual National Employee Services and Recreation Association Bowling Tournament. Las Amigas placed first in the Regionals in the Women's Division with a team score of 2788. Team members include Juanita Evans (132), Sally Frew (3523), Dora Gunckel (6400), Lea Long, and Lin Ohrt. The Titans placed first in the Regionals in the Men's Division with a team score of 3052. Team members include Bill Drozdick (2858), Glenn Folkins (5153), Ken Jones (2851), Joe Rodzewich (2852), and Curt Warthen (2331).

* * *

More Bowling — The Sandia Labs Men's Handicap Bowling League needs two- to five-man teams and men to fill two teams for the upcoming season. The league bowls Thursday evenings at 6:30 p.m. at Holiday Bowl. The season starts in late August or early September. For information, call Lou Sanchez on 4-6453 or Fred Gunckel (2543) on 6-7235.

* * *

Archery — If you're looking for a place to practice archery skills, the Manzano Archery Club has a practice range and a field range available. You must be a member to shoot on the ranges. For membership information, contact Dewey Reed on 4-4558 or Kerry Lamppa (1264) on 4-2273.

Welcome

Albuquerque
- Nova Carter (7412)
- Donna Chavez (7412)
- Elizabeth Forbes (3210)
- John Linebarger (2629)
- Gary Simmons (7412)

Arizona
- Kenneth Davis (5127)
- Ronald Kidner (5145)

California
- Kevin McCurley (1423)

Illinois
- Timothy Irwin (2853)

Montana
- James Tauscher (5172)

Nebraska
- Bevan Staple (6412)

New Mexico
- Anna Otero (7412)

Texas
- Benjamin Butchko (5141)

Utah
- Tamera Mounteer (5147)

feedback

Q. Who should be the beneficiary of accrued airline "flight miles" and/or other gifts resulting from business trips taken by Sandia employees?

A. Transferrable frequent-flyer passes and coupons, earned by accumulating Sandia-paid business miles, should be used to reduce the cost of subsequent Sandia business trips. SLI 4600, "Employee Travel and Business Expenses," provides guidance on this topic in the "Refunds" subsection on page 17: "Any cash rebates, bonuses, discounts, credits, or refunds resulting from travel paid for by Sandia are the property of Sandia."

Passes and coupons should be attached to vouchers and sent to Employee Accounting Div. 152 immediately upon return from the business trip.

Paul Stanford — 100

Q. The parking problem at Sandia is acute. Several parking lots have been eliminated to make way for new construction; for example, the area west of Bldg. 878 and north of Bldg. 890 used to be a parking lot. When new buildings in the area are completed, will this parking area be restored — or is it lost forever?

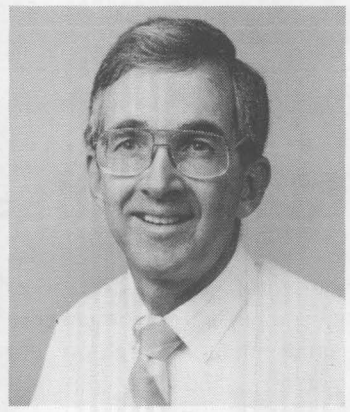
A. It is true that some parking lots have been lost to new construction projects, but it is also true that we have provided enough additional parking lots to provide enough paved parking spaces to accommodate Sandia needs. We do plan to restore a portion of the parking lot north of Bldg. 890, but it is only a matter of time until this lot will also be used as a new building site.

We have parking lots on all four sides of Tech Area I. As parking lots are lost to construction, it is our intention to add other lots as required to provide an adequate number of paved spaces. It's inevitable that new parking lots will be farther away from the tech area.

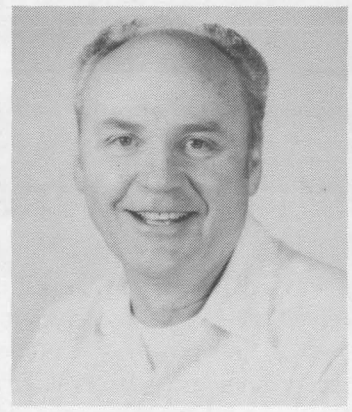
Ward Hunnicutt — 7800

MILEPOSTS
LAB NEWS

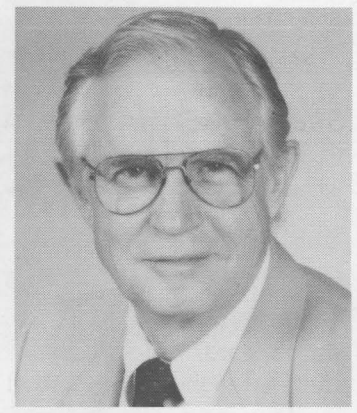
AUGUST 1989



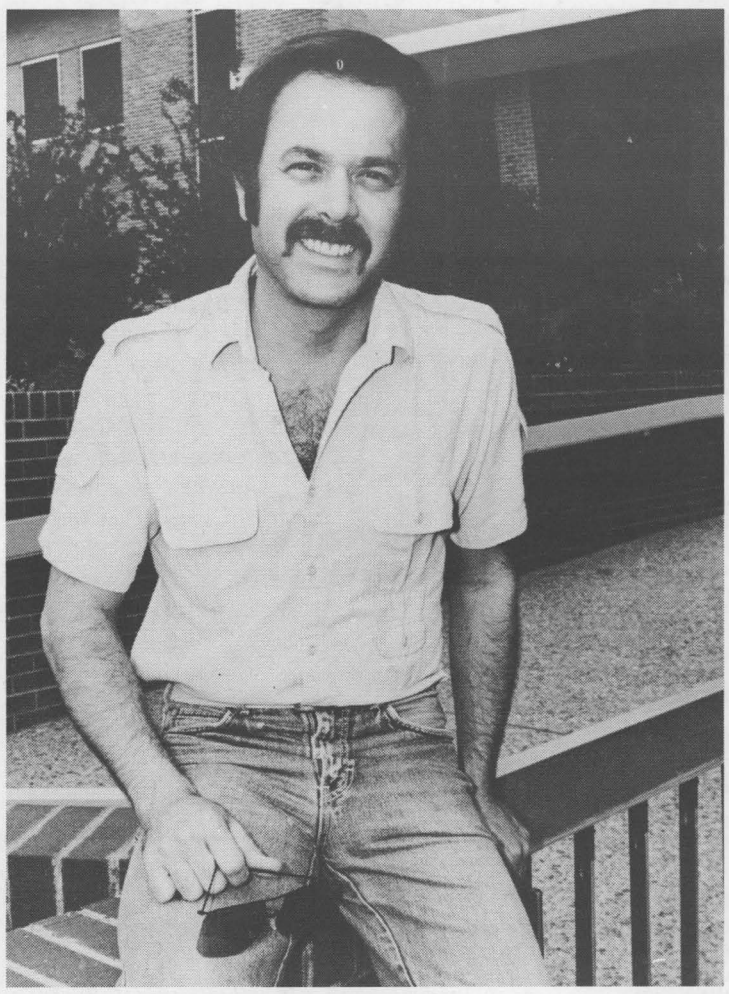
Philip Stanton (DMTS, 2514) 25



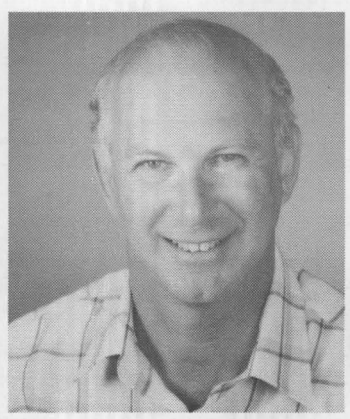
Ray Culy (8452) 30



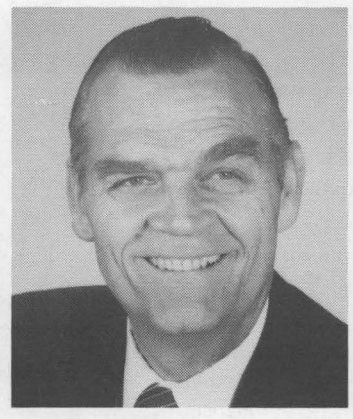
Ralph Cozine (8510) 30



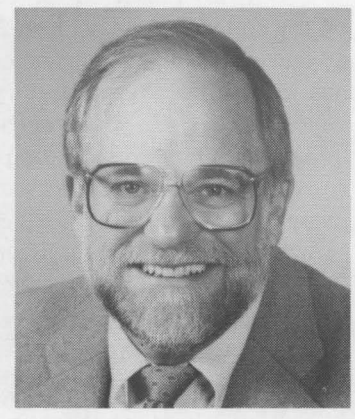
Richard Chavez (7241) 20



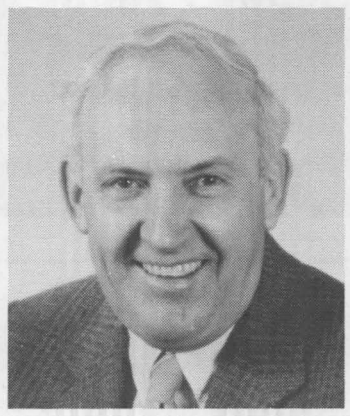
Dave Abrahams (8285) 30



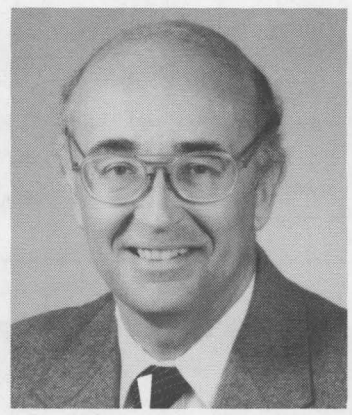
Bob Facer (8132) 30



Bill Robinson (8240) 25



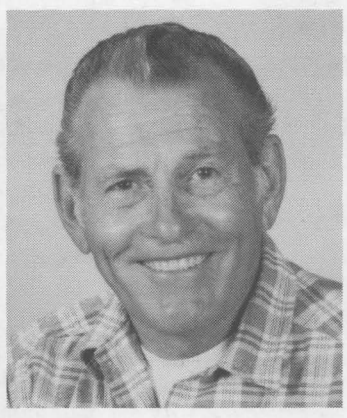
Dave Dean (DMTS, 8132) 30



Ron Detry (8200) 20

Gail Bryan (8236) 20

Bob Kee (8245) 20

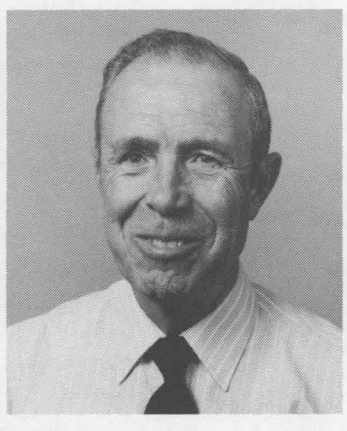


Bob Lebow (8513) 20

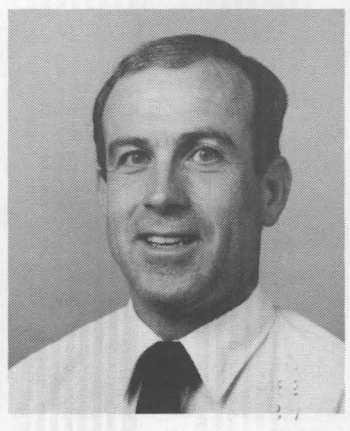
Marge York (8523) 20

Dennis Mitchell (2513) 20

Greg Soo (8445) 15



Norm Baker (5122) 30



Bob Bradley (5128) 20

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

Deadline: Friday noon before week of publication unless changed by holiday. Mail to Div. 3162.

Ad Rules

1. Limit 20 words, including last name and home phone.
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8½ by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per category per issue.
8. No more than two insertions of same "for sale" or "wanted" item.
9. No "For Rent" ads except for employees on temporary assignment.
10. No commercial ads.
11. For active and retired Sandians and DOE employees.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

TELESCOPE, Mead Schmidt Cassegrain, model 2080, tripod, wedge, motor drive, case, other accessories. Newman, 292-7351.

FOUR NEW GOODRICH TIRES, all-terrain, T/A radials, mounted on Empco polished-aluminum wheels, fit Samari, Ford trucks, Bronco, Jeeps, $550. Bliss, 296-3752.

CAMCORDER, Zenith VM6200, case, battery, 6 cassettes, charger, VHS cassette adapter, 2-yr. service contract, cable-TV playback, $650. Rainhart, 821-3690.

BOX SPRING AND MATTRESS for double bed, $100; solid-wood doors, 24" x 78", $20/ea. Pitts, 291-5481 leave message.

CRIB, w/Sealy mattress, $70; One-Step car seat, $18. Klassen, 299-6619.

WINDOWS: two 3' x 6' double-pane, single-hung, $5/ea. Dykhuizen, 281-9463.

SAMSONITE SUITCASES, 26" w/wheels and 24", $25/both; Sears slide projector, $50; 78-rpm records, make offer. Lewin, 898-2303.

SOLID-OAK TABLE, 36" round, 2 solid-oak director's chairs, $125 OBO. Spears, 266-9782.

COMPUTER-PRINTER SYSTEM: Commodore 64, Epson RX-80F/T printer, Zenith green-screen monitor, disk drive, operating manuals, cables, $395. Adams, 256-7265.

TWO-PIECE LUGGAGE, American Tourister, 26" bag and tote, brown soft-side, $28; oak bar stool, $25. Burstein, 821-6688.

CANOPY BED, white wood frame, $50; white eyelet canopy, ruffle, $25; cello, 3/4-size, Pfretzschner, w/bow and case, $800. Drotning, 294-4807.

QUEEN-SIZE WATER BED, w/single-layer drawer pedestal, cushion pads, bookshelf headboard, $125. Laguna, 298-1732.

MOTORCYCLE ACCESSORIES: fitted tarp, helmet, gloves, Hippo Hands. Aurand, 281-4027.

IMPORTED 55-PIECE BAVARIAN CHINA; electric kabob basket, w/8 skewers. Gipson, 298-7073.

AM/FM STEREO AMPLIFIER, H.H. Scott, 60-watt, solid-state, includes manual, no speakers, $30. Meikle, 299-4640.

RADIO-CONTROL AIRCRAFT RADIO SYSTEM, Cirrus 900XLC, 7-channel, $75. Benecke, 292-5009.

KENMORE SIDE-BY-SIDE REFRIGERATOR, 19.1 cu. ft., gold, $100; Amana full-size microwave oven, $50. Jones, 293-0578.

LONG-BED VAN ACCESSORIES: storage bolsters, tan seat cushions, 38" x 26" table (converts to 6' x 6' bed), $75 OBO. Witek, 296-5198.

QUEEN-SIZE SOFT-SIDE WATER BED, uses regular sheets, individual bags w/heaters, cost $700, sell for $300 OBO. Burns, 281-2793.

SPANISH-DESIGN CHANDELIER, 4-light, $25; heavy-duty engine hoist, $125; nitrous oxide system, $125. Prevender, 296-8586.

STUDENT VIOLIN, Scherl and Roth, w/case, $350. Magnuson, 268-5955.

TELESCOPE EQUIPMENT: equitorial mount w/clock drive, $175; various eyepieces, Barlow lens, photoguide scope, optic stellar photometer, more. Van Den Avyle, 898-6474.

TAPPAN GAS RANGE, $35. Mozley, 265-2625 days, 299-4204 after 5.

GE WASHER AND DRYER, apartment-size, almond, 2 yrs. old, $375. Chavez, 898-6147.

KENMORE REFRIGERATOR/FREEZER, frost-free, 15.1 cu. ft., $250; kitchen utility cabinet, $40. Myers, 294-7316.

FURNITURE: love seat, $75 OBO; bookcase, 48" W x 54" H, oak veneer, $50 OBO. Sikora, 891-7862.

CURTIS MATHES COLOR TV-ENTERTAINMENT CENTER, best offer. Watkins, 884-3352 after 7.

HARDWICK GAS STOVE, almond, new, $250. Sons, 889-9379.

HANGING POT RACK, $35. Mozley, 884-3453.

POOL TABLE, w/balls and cues, $75 OBO. Hansen, 823-9515.

MAN'S LYNX GOLF CLUBS SET, 2 golf pull-carts, 1 golf bag. Worden, 881-4486.

PRO-30 HAND-HELD SCANNER, 9 bands, 16 channels, direct-entry programmable, includes aircraft band and search function, $113. Newman, 299-6018.

DRAPES, steel-blue and antique-white tweed, sheers and rods included, 85" x 105", $40. Meyer-Hagen, 293-7339.

THREE-D CAMERA, w/flash, case, $250. LeMaster, 877-4884.

STEREO AUDIO CASSETTE TAPE DECKS, Kenwood and Sharp, $75/ea. Hale, 298-1545.

FIFTH-WHEEL TRAVEL TRAILER, '87 Hitchhiker, Champaign model, 33', w/slide-out room, extra options. Zimmerman, 897-1704.

HUNTING BOW, Browning 50-70 lbs. compound, 29-32" draw, $100. Muirhead, 281-2925.

HIGH CHAIR, portable playpen, REI baby bag/backpack. Jansma, 292-5430.

WASHBURN GUITAR, w/through-body neck and Wonderbar Trem. system, 4 yrs. old, $500. Hargis, 294-0169.

COMPUTER PAPER: 1, 2, and 6 parts; office desk and chair, $60; Ricoh Repro copier, $500. Griffin, 294-5702.

BERNINA 801 SEWING MACHINE, 7 stitches, 6 presser feet, automatic buttonholer, free arm, w/carrying case, $450. Williams, 344-9276.

NIAGARA CYCLO-MASSAGE RECLINER, brown; queen-size couch/sofa bed, gold/brown plaid, make offer. Bear, 881-7128.

SEARS UPRIGHT FREEZER, new, 11 cu. ft., vacuum seal, security lock, $250; gasoline chain saw, Sears, new, 3.7 cu. in./20", w/carrying case, $300. Walton, 897-0092.

FRANKLIN WOOD STOVE, inside pipe, outside triple-wall pipe, screen, wood stand, fireproof pad included, $175. Fleming, 881-2223 or 888-0744.

COMPACT REFRIGERATOR, Avanti, 1.6 cu. ft., $50. Yaniv, 294-4490.

WALTER HAGEN GOLF CLUBS, 13 ea., $150; Spalding bag and 2-wheel caddy, $75 OBO. Mason, 281-3052.

QUEEN-SIZE WATER BED, no-motion mattress, dark-stained bookcase headboard and frame, needs liner and heater pad. Phillips, 268-7212.

WHEELCHAIR, $150. Resnick, 292-3825.

EXERCYCLE, w/odometer and speedometer, $68. Horton, 883-7504.

QUEEN-SIZE WATER BED, looks like conventional bed, $150. Levin, 897-7145.

OUTBOARD MOTOR, 7-hp, standard shaft, single-cylinder, air-cooled, Sears Ted Williams, w/remote fuel tank and hose, $175. Meidal, 255-6690.

AT&T 6300 PERSONAL COMPUTER, 640KB, 20MB HD, math co-processor, ROM Ver. 1.43, monochrome, $700 OBO. Larsen, 292-1502.

MULTICOLORED GOLD SHAG RUG, 9' round, fringed, pad, $50; basketball pole, 3-1/2" diameter, make offer. Lane, 884-4566.

SHERWOOD 7110 RECEIVER, $20; Omega CT-424-7 temperature and humidity 7-day chart recorder, $25. Guilford, 255-6294.

BOY'S THOMASVILLE BEDROOM SET: 2 chests, bookcase, desk, chair, $600; console humidifier, $55; wheelbarrow, $8. Caskey, 296-6372.

CAMPER SHELL, for short wide pickup. Williams, 296-6282.

GARAGE SALE: bicycles, clothing, shoes, toys, sports equipment, household items, misc., Aug. 12-13, 8 a.m.-4 p.m., 6428 Samantha NE. Decker, 821-2751.

COMPUTER CENTER, 49" x 30", w/cabinet, bookcase, adjustable shelf, cable feed-throughs, adjustable pads, $125. Luna, 255-2220.

TWIN-MATTRESS SET, $45; Octo gym, $50; timing light, $15; bunk-bed frame, $25; electric heater, $25; bunk mattress board, $25. Stevenson, 898-8030.

WOOD WINDOWS: Marvin unclad casement, new, 40" x 39", 40" x 55"; used 3-pane, 60" x 63". Beattie, 898-2706.

REMINGTON SHOTGUN, model 1100, modified choke, rib barrel, $315. Smith, 823-9521.

WARD'S UPRIGHT FREEZER, 21 cu. ft., $150. Tucker, 869-3469.

WOMAN'S GOLF CLUBS, short set w/bag. Babb, 296-7955.

COUCH, sand/tan, w/hassock, $200; king-size water bed, bookcase headboard, 6-drawer underdresser, king pillows, linens, $300. Botsford, 292-3679.

MACINTOSH 512KE COMPUTER, 2 drives, mouse, fan, manuals, software, more, $900; ImageWriter II, wide carriage, $350. Leslie, 266-1797.

CORNING ELECTRIC COOKTOP, $80; camper icebox, $20; bottled-water dispenser, $45. Hall, 243-3672.

ROWING MACHINE EXERCISER, Amerec model 610, $50. Hannum, 296-2095.

QUEEN-SIZE SOFA SLEEPER, Benchcraft, earth tone, Scotch-guarded, $200 OBO. Garcia, 292-0979.

HYBRID DAYLILIES, perennial, call for information. Hosking, 836-2128.

TRANSPORTATION

'83 YAMAHA 750, 4.3K miles, $1300. Edwell, 299-4551.

'75 JEEP CHEROKEE, 258-6, AM/FM stereo, $1000 OBO. Burns, 281-3922.

'79 CAMARO RALLY SPORT, PS, PB, PW, PL, cruise, tilt, rebuilt 350, 4 new Eagle GT tires. Armijo, 836-5769.

'85 JEEP CHEROKEE, 4-WD, loaded, 55K miles, new engine. Aurand, 281-4027.

'84 HONDA XR200 MOTORCYCLE, mountain and hunting machine, $450. Muirhead, 281-2925.

'82 COACHMAN MOTORHOME, 22', 350 engine, roof air and heat, trailer hitch, windshield cover, 4K generator, extra gas tank. Knight, 275-3669.

'85 MAZDA GLC-LX, 2-dr., $2500 OBO. Newman, 299-6018.

'78 PORSCHE 911SC, red, brown leather interior, 74K miles, AC, recent major service, clutch, tensioners, $16,750. Freeman, 296-2977.

'77 DATSUN Z28, new engine and transmission, $3100 OBO. Zamora, 898-8571.

TRIALS MOTORCYCLES: '88 TR34 Beta, $2500; '85 TY350 Yamaha, $1250; 3-rail motorcycle trailer w/ramp, $450. Pryor, 294-6980.

'72 MERCEDES 280SE 4.5, 4-dr., V-8, 86K miles, AC, AT, brown w/tan interior, $5700. Van Den Avyle, 898-6474.

'84 MONTE CARLO SS, loaded, 34K miles, white w/blue striping, $8200. Dyckes, 299-7280.

'76 HOLIDAY RAMBLER, new tires, dual exhausts, TV, stereo, 52K miles, $9500. Revels, 344-3033.

MAN'S BIKE, Schwinn Varsity, $40. Prevender, 296-8586.

'76 SUZUKI GT750 MOTORCYCLE, trunk and saddle bags, fairing, 30K miles, $900 OBO. Vernon, 892-6571.

'76 GMC JIMMY, 4x4, extras, $3900. Stefoin, 296-2791 leave message.

SAILBOAT, Topper (J.V. Dunhill, England), 12', racing dinghy, can be carried on car top, 65-sq.-ft. sleeved sail, cost $1200, sell for $750. Schkade, 292-5126.

MAN'S 10-SPD. SCHWINN BICYCLE, w/rack and water-bottle cage, $75 OBO. Morrow, 293-4623.

'85 PORSCHE 944, red, new tires, 30K miles, loaded, $2500 stereo system, $15,900; man's 10-spd. bike, Raleigh Grand Prix, $100. Dwyer, 291-8466.

'83 VOLVO DL, 4-dr., AC, 75K miles, standard/OD, one owner, maintenance records, $5500. Jansma, 292-5430.

'70 CHEV. PICKUP, rebuilt 6-cyl., 4-spd., 10K miles, $800 OBO; '70 Chev. SW, AT, AC, new tires, $1800 OBO. Griffin, 294-5702.

'49 JEEP CJ-3, canvas top, new battery, tow bar, $1200. Schuster, 299-1072.

'76 CHEV. CUSTOM DELUXE 10 PICKUP, SWB, 350 engine, 3-spd., one owner, 64.4K miles. Trujillo, 1-864-4340.

'76 HONDA WAGON, 4-spd., 100K miles, $400 OBO. Costley, 291-8667.

'83 SILVERADO PICKUP, 3/4-ton, diesel, loaded. Baca, 265-2881.

'72 SUBURBAN, 3/4-ton, 402 AT, dual AC, tilt, PS, PB, $1800. White, 869-6826.

'84 CHEV. CELEBRITY SW, V-6, AT, AC, cruise, stereo cassette, new tires and battery, 93K miles, $3300 OBO. Prior, 281-5532.

'84 DODGE CARAVAN SE, gold, AT, AC, PS, rebuilt transmission and front end, $5000. Mueller, 281-1766.

'75 DODGE PICKUP, 3/4-ton, crew cab, AT, PS, PB, AC, w/camper shell, 93K miles, $1800. Zutavern, 294-6796.

RECUMBENT BICYCLE, Lightning P-38, 15-spd., custom-made, chrome/molly frame, accommodates riders 5'2" to 5'10". Corwin, 265-6588.

BICYCLES: 2 Schwinn Varsities, 23" man's, 19" woman's; Mongoose BMX, 20"; woman's 26"; Vetta Turbo Trainer; skateboard; scooter. Schroeder, 296-1011.

COLEMAN CANOE, 15', w/oars, cartop carrier, life jackets, anchor, $225; '85 NINJA 900 motorcycle, 7.5K miles, original owner, $2200. Hubbard, 281-1779.

'81 CHEV. MALIBU CLASSIC, 350, new brakes, needs paint, $995. Barton, 268-7349.

'56 JEEP CJ-5, 327 Chev. engine, power take-off, heavy suspension, needs some restoration, $350 OBO. Zuchowski, 281-5678.

'85 ISUZU I MARK, 33K miles, $2900. Hall, 243-3672.

'70 PORSCHE 911T, burgundy, 72K miles, AM/FM cassette, daisy mags, 5-spd., all original, $8200. Benavides, 897-1317.

'84 LINCOLN MARK VII, 18.5K miles, AM/FM cassette, charcoal gray, extras, $11,900. Thorne, 884-4870.

'86 HONDA CRX, 37K miles, AC, cruise, AM/FM cassette, alarm, custom paint, $6500. Tessler, 293-5628.

REAL ESTATE

4-BDR. HERITAGE EAST HOME, 3 yrs. old, LR, DR, FR/wFP, 2 baths, kitchen w/nook, 2-car garage, landscaped, front sprinklers, 1915 sq. ft., $141,000. Dobias, 822-0013.

HERITAGE MOBILE HOME, 12' x 66', in Shaw Park, appliances and awning. Gipson, 298-7073.

3-BDR. HOME, 1-3/4 baths, LR w/FP, sprinklers, 2-car garage, 1420 sq. ft., 10901 Prospect NE, $75,000. Larsen, 292-8874.

ONE-HALF-ACRE LOT, near golf course and pond in Pendaries (near Las Vegas, NM). Worden, 881-4486.

3-BDR. HOME, one-half acre, 1625 sq. ft., passive solar, 2 baths, 2-car garage, off N-14, mountain view, $87,000. Diegert, 291-8614.

40.55 ACRES, Pagosa Springs, near Fairfield Resort, national forest borders two sides, river runs through property, $100,000. Dwyer, 291-8466.

4-BDR. HOUSE, Academy Place, off Spain near Juan Tabo, spa room, 2137 sq. ft.,$125,500. Simpson, 299-3065.

4 ACRES, S-14/Hwy. 222 area, wooded lot w/building site for solar, water. Wilde, 281-4511.

3-BDR. KACHINA HILLS CUSTOM HOME, country kitchen, sunroom, landscaping, solar, RV access, more, open Sunday, Aug. 13. Myers, 294-7316.

3-BDR. HOME, 1-3/4 baths, double garage, landscaping, FP, electric kitchen, near Tramway and Lomas. Meahl, 281-5323.

2-BDR. TOWNHOUSE, Candelaria and Tramway, 2-1/2 baths, 1-car garage w/auto opener, $72,000. DeHerrera, 892-3535.

3-BDR. HOME, 1 bath, garage, workshop, sunporch, new paint, carpet, tile, $57,000. Erni, 865-8226 call for appointment.

WANTED

PUPPY: Lab or Lab cross, prefer female, about 6-8 weeks. Evans, 836-4922.

ROOMMATE, to share 3-bdr., 2-bath house, washer/dryer, 2-car garage, pets okay, $310/mo. plus $90 utilities. Schuh, 821-3833.

HOUSEMATE, female nonsmoker, to share 2-bdr. house in Ridgecrest area, full access to kitchen, bath, washer/dryer, private backyard, off-street parking, FP. Hlava, 265-4178.

HOUSEMATE, nonsmoker, to share 3-bdr., 2-bath home in Sandia Park (east of N-14 off Frost Road), $250/mo. plus share utilities. Romero, 281-8765.

REFRIGERATOR, dorm-room size, prefer 4.8 cu. ft. Chao, 268-3661.

SHOP MANUALS for '77 Dodge van. McDaniel, 281-9166.

GM SHOP MANUAL for '79 Trans Am. Shambo, 294-8530.

PRACTICE GUITAR AMP, in good condition. Trujillo, 865-0253.

DOGHOUSE, for medium to large dog, insulated, reasonably priced. Austin, 831-2511.

LOST AND FOUND

FOUND: two separate wedding bands, identify and claim, one has initials and date inside. Brigham, 293-6914.

FOUND: three keys on Mothers Against Drunk Drivers key chain, found at Sandia Peak Ski area, keys include one COLE, one Datsun, one Sandia. Suiter, 881-2042.

LOST: man's gold Pulsar wristwatch w/brown leather band. Hueter, 242-1620.

Coronado Club Activities

Friday-Night Feature: Real Food for Real People

WHERE'S THE BEEF? Just in case you don't know the answer, we suggest you head for the Club tonight to find out. Baron of beef (naturally) is the featured attraction at the Beefeaters' Buffet, which also includes baked chicken, rice pilaf, vegetables, rolls, and — for dessert — cake. At $6.95/plate, it's a deal that can't be beat. Afterward, Together plays variety music for dancing from 8 p.m. to midnight. Dinner reservations requested (265-6791).

IT'S HOMESTRETCH TIME for Wednesday-night family get-togethers at poolside. You have just three more opportunities — Aug. 16, 23, and 30 — to relax after work with a cool dip in the pool (open until 8 p.m.) and to enjoy just-right picnic food from the grill and buffet line.

THE BRUNCH BUNCH is back in business on Sunday, Aug. 20. Served from 10 a.m. to 2 p.m., a mouth-watering menu features fried chicken, baron of beef, pancakes, Denver omelets (different from the Albuquerque kind), tossed salad, corn O'Brien, hash browns, a variety of cakes and puddings, and a complimentary — and complementary — glass of champagne. The best news: All this good stuff costs just $6.95/adults, $3.50/children 3 to 11 years old, and free/ankle-biters under 3. Reservations recommended.

SPEAKING OF GOOD DEALS, the T-Bird card sharks go back to the tables Thursday, Aug. 24, for gaming, gab, and goodies. Plan to be there when the action starts — 10 a.m.

BARBECUE NIGHT next Friday (Aug. 18) features finger-lickin'-good BBQ beef/chicken/ribs with all the trimmings for only $6.95/plate. From 8 p.m. to midnight, Billy Glenn & Texas Sand (what's wrong with New Mexico's?) provide music for your dancing pleasure.

Take Note

An estimated 400 shock-compression researchers will meet at the Albuquerque Convention Center Aug. 14-17 to discuss their work. Organized by scientists within the American Physical Society, the group's sixth biennial meeting is being hosted by scientists from Sandia and Los Alamos national laboratories. For more information, contact Bob Graham (DMTS, 1153) on 4-1931.

* * *

All aboard! The Friends of the Cumbres and Toltec Scenic Railroad is sponsoring a special charter moonlight train ride on the Cumbres and Toltec Scenic Railroad Aug. 19 from Chama to Osier and back to Chama. A steak dinner will be provided in Osier. Tickets are $40/adult, $20/child. Half of the adult ticket price for this trip may be considered a charitable contribution and is tax-deductible. The Friends is a nonprofit corporation devoted to the preservation of the 64-mile, narrow-gauge line between Chama, N.M., and Antonito, Colo., owned by the states of New Mexico and Colorado. Family memberships are $15. For information about the moonlight ride and Friends membership, contact Roger Breeding (6413) on 6-6630.

Events Calendar

Events Calendar items are gathered from various sources. Readers should confirm times and dates of interest whenever possible.

Aug. 11 & 19 — "Lone Star" and "Laundry and Bourbon," by James McLure, night and day in Texas, for mature audiences, presented by Theatre-in-the-Making; 8 p.m., CenterStage (3211 Central NE), 260-0331.

Aug. 11-31 — Exhibit, "The Dinosaur Portfolio," 33 mixed-media and oil paintings and drawings by University of Maine art professor Philip Carlo Paratore; 9 a.m.-6 p.m., New Mexico Museum of Natural History, 841-8837.

Aug. 11-Sept. 10 — "Cartoons and Commentary on Photography," exhibit honoring photography's 150th birthday, popular view of photography as portrayed in cartoons and posters, UNM Centennial Event (gallery talk 5:30 p.m. Aug. 22); 9 a.m.-4 p.m. Tues.-Fri. (5-9 p.m. Tues. evening); Van Deren Coke and West galleries, UNM Art Museum, 277-4001.

Aug. 11-Sept. 10 — Exhibit, "Mexican Ceramics from the Collection," showing of contemporary ceramic folk art and crafts from Mexico; 9 a.m.-4 p.m. (5-9 p.m. Tues. evening); West gallery, UNM Art Museum, 277-4001.

Aug. 11-Sept. 15 — "Raymond Jonson Cityscapes," exhibit featuring drawings and paintings by Jonson from the 1920s to 1940s; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues. evening; Jonson Gallery, UNM Art Museum, 277-4967.

Aug. 11-Sept. 17 — "Art Since 1945," exhibit featuring paintings, sculpture, and prints from the permanent collection, highlighting later twentieth-century art (realism, geometric abstraction, and expressionism); 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues. evening, 1-4 p.m. Sun.; upper gallery, UNM Art Museum, 277-4001.

Aug. 11-Sept. 30 — Exhibit, "Moon, Man, & Mars," commemorates 20th anniversary of man on the moon with video, still photographs , and a moon rock; guest curator, former astronaut and US Senator Harrison Schmitt; 9 a.m.-6 p.m., New Mexico Museum of Natural History, 841-8837.

Aug. 12 — Santa Clara Feast Day: Buffalo, Comanche, and Corn dances; call for time, Santa Clara Pueblo, free, 843-7270.

Aug. 12 — Summerfest '89, Italian Night: ethnic food and entertainment; 5-10 p.m., Civic Plaza, free, 768-3550.

Aug. 12, 17, & 18 — "An Evening of One-Act Plays," fantasy and fancy one-act plays by George Bernard Shaw, David Hwang, and John Guare, Theatre-in-the-Making presentation; 8 p.m., CenterStage (3211 Central NE), 260-0331.

Aug. 12 & 19 — "Humpty Dumpty, Too," story-theatre with audience participation, performed by Youth Performance Workshop, Theatre-in-the-Making presentation; 2 p.m., CenterStage (3211 Central NE), 260-0331.

Aug. 13 — Arts in the Parks 4th Annual Jazz Festival, Albuquerque and Santa Fe jazz groups, activities for children including clowns and face painting; call for time, Roosevelt Park (Roosevelt & Sycamore SE), free, 764-1525.

Aug. 13 — Exhibit opening, "The Pueblo Revival Archictecture of John Gaw Meem," architectural drawings and photos of Meem's buildings; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 242-4600.

Aug. 15 — San Antonio Feast Day: Corn dances at Laguna and Zia Pueblos, free, call for time, 843-7270.

Aug. 16 — Moon, Man, & Mars Speakers' Series: "Future Geological Exploration of the Moon," Jeffrey Taylor (UNM Institute of Meteorics); 7 p.m., New Mexico Museum of Natural History, 841-8837.

Aug. 17-19 — Bernalillo County 4-H Fair: livestock, crafts, exhibits, rodeo; call for times, NM State Fairgrounds, 243-1386 or 265-1791.

Aug. 18-19 — New Mexico Storytelling: Spanish and Indian stories told by master storyteller Teresa Pijoan de Van Etten; 7-8 p.m. Fri., 3-4 p.m. Sat.; Elena Gallegos Open Space Park, free, 291-6224.

Aug. 20 — Albuquerque Philharmonia Orchestra special concert, plus other entertainment; 1:30 p.m., Inez Park (Virginia & Cutler NE), free, 864-1525 or 899-8902.

Aug. 20 — Sunday Blues at Madrid: area blues groups; 3-7 p.m., Oscar Huber Memorial Ballpark (N-14, Madrid), 255-9798.

Aug. 19 — Summerfest '89, German Night: ethnic food and entertainment; 5-10 p.m., Civic Plaza, free, 768-3550.

Aug. 23 — Moon, Man, & Mars Speakers' Series: "The Earth from Above," NASA astronaut Maj. Sidney Gutierrez; 7 p.m., New Mexico Museum of Natural History, 841-8837.

Aug. 23 — Sunwest Bank/Charley Pride Golf Classic Dinner Show; 6 p.m., Albuquerque Convention Center ballrooms; call for tickets, 765-3179.

THIS YEAR'S GROUP OF OYOC (One-Year-On-Campus) participants, who signed in at Sandia this spring, gathered recently for this photo with OYOC registrar Ruth Brooks (3521, left) and coordinator RoseAnn Poloncasz (3511, right). Patricia Salisbury (second from left, 3511) will coordinate the program next year. OYOC, an Affirmative Action program, enables outstanding minority students with BS degrees to earn MS degrees in engineering or computer science during their first year with Sandia. After working at the Labs this summer, participants will attend one of 17 OYOC-approved universities during the 1989-90 school year. Participants are (from left) Fernando Bitsie (7253), Vanessa Watkins (9216), Susan Chao (9212), Daniel Moreno (2174), Son Mai (5245), Laurence Brown (7471), and Mark Martin (7222). Not pictured: Bevan Staple (6412).